WHAT IS CLAIMED IS:

1. A method for the operation of an internal combustion engine comprising the steps of:

providing oxygen-enriched air and fuel to a combustion chamber;

initiating combustion of the oxygen-enriched air and fuel; and

providing a predefined volume of nitrogen-enriched air to the combustion chamber after a predefined time delay to be used during the remainder of the combustion.

2. The method of claim 1, wherein prior to the step of providing oxygen-enriched air and fuel to a combustion chamber:

providing an input air stream to a membrane; and

separating, using the membrane, an input air stream to produce the oxygen-enriched air and the nitrogen-enriched air.

3. The method of claim 1, wherein the predefined time delay comprises:

substantially four milliseconds.

4. The method of claim 1, wherein the predefined volume of nitrogen-enriched air comprises:

substantially ninety-percent of the volumetric mass within the combustion chamber.

5. The method of claim 1, wherein the internal combustion engine comprises:

a diesel engine.

6. The method of claim 1, wherein the internal combustion engine comprises:

a gasoline engine.

7. An apparatus comprising:

a separation device for receiving an input air stream and producing oxygen-enriched air and nitrogen-enriched air;

a holding chamber for receiving the nitrogen-enriched air from said separation device; and

a combustion chamber for receiving the oxygen-enriched air from said separation device and a combustible fuel, the combustion chamber initiating a combustion process using the oxygen-enriched air and the combustible fuel, and further receiving a predefined volume of the nitrogen-enriched air from the holding chamber after a predefined time delay to be used during the remainder of the combustion process.

8. The apparatus of claim 7, wherein said separation device comprises:

a membrane.

9. The apparatus of claim 7, wherein the predefined time delay comprises:

substantially four milliseconds.

10. The apparatus of claim 7, wherein the predefined volume of nitrogen-enriched air comprises:

substantially ninety-percent of the volumetric mass within the combustion chamber.

11. The apparatus of claim 7, wherein the holding chamber further comprises:

at least one of an injection nozzle, an electronic valve, a mechanical valve, and a pump for providing the desired predefined volume of the nitrogen-enriched air to the combustion chamber.

12. The apparatus of claim 7, wherein the internal combustion engine comprises:

a diesel engine.

13. The apparatus of claim 7, wherein the internal combustion engine comprises:

a gasoline engine.

14. An internal combustion engine comprising:

a separation device for receiving an input air stream and producing oxygen-enriched air and nitrogen-enriched air;

a holding chamber for receiving the nitrogen-enriched air from said separation device; and

a combustion chamber for receiving the oxygen-enriched air from said separation device and a combustible fuel, the combustion chamber initiating a combustion process using the oxygen-enriched air and the combustible fuel, and further receiving a predefined volume of the nitrogen-enriched air from the holding chamber after a predefined time delay to be used during the remainder of the combustion process.

15. The internal combustion engine of claim 14, wherein said separation device comprises:

a membrane.

16. The internal combustion engine of claim 14, wherein the predefined time delay comprises:

substantially four milliseconds.

17. The internal combustion engine of claim 14, wherein the predefined volume of nitrogen-enriched air comprises:

substantially ninety-percent of the volumetric mass within the combustion chamber.

18. The internal combustion engine of claim 14, wherein the holding chamber further comprises:

at least one of an injection nozzle, an electronic valve, a mechanical valve, and a pump for providing the desired predefined volume of the nitrogen-enriched air to the combustion chamber.

19. The internal combustion engine of claim 14, wherein the internal combustion engine comprises:

a diesel engine.

20. The internal combustion engine of claim 14, wherein the internal combustion engine comprises:

a gasoline engine.